

Securing the Bomb 2006

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EXECUTIVE SUMMARY

Urgent actions are needed to prevent a nuclear 9/11. Terrorists are actively seeking nuclear weapons and the materials to make them. With the needed nuclear materials in hand, making at least a crude nuclear bomb, capable of turning the heart of any modern city into a smoking ruin, is potentially within the capabilities of a sophisticated terrorist group. Yet scores of sites where the essential ingredients of nuclear weapons exist, in dozens of countries around the world, are clearly not well enough secured to defeat the kinds of threats that terrorists and criminals have demonstrated they can pose.

Wherever an insecure cache of potential nuclear bomb material continues to exist, there is a threat to U.S. homeland security and to the security of the world that must be addressed as quickly as possible. Keeping nuclear weapons or materials from being stolen in the first place is the most direct and reliable tool for preventing nuclear terrorism, for once such items have disappeared, the problem of finding them or stopping terrorists from using them multiplies enormously.

A dangerous gap remains between the urgency of the threat of nuclear terrorism and the scope and pace of the U.S. and world response. That gap has been narrowed in recent years, with actions such as the accord on nuclear security between U.S. President George Bush and Russian President Vladimir Putin at their 2005 summit in Bratislava, Slovakia, and the launch of the Global Threat Reduction Initiative (GTRI) in early 2004. But much more needs to be done.

SECURING STOCKPILES IN THE FORMER SOVIET UNION

In Russia and the other states of the former Soviet Union, there is some good news to report, but there is still far too much bad news. Nuclear security has improved substantially, but significant threats of nuclear theft remain. A decade and a half after the collapse of the Soviet Union, the most egregious nuclear security weaknesses of the early 1990s—gaping holes in fences, buildings with no detector at the door to sound an alarm if some one was carrying out plutonium—have largely been fixed through a combination of international assistance programs and the former Soviet states' own efforts. In the aftermath of the Bratislava summit, moreover, Russian and U.S. experts agreed on a joint plan for completing a specified list of security upgrades by the end of 2008—though the agreed list still leaves some nuclear warhead and nuclear material sites uncovered. The pace of progress has also accelerated: security and accounting upgrades were completed at more buildings holding nuclear material in fiscal year (FY) 2005 than in any previous year of the effort.

Security upgrades are far from complete, however, and the challenges to effective security are daunting. As of the end of FY 2005, U.S.-funded comprehensive security and accounting upgrades had been completed for 54% of the buildings in the former Soviet Union with potentially vulnerable weapons-usable nuclear material, leaving an immense amount of work to be done to meet the 2008 target. Many of the buildings not yet completed may still

be vulnerable to relatively modest threats, and even the buildings where comprehensive upgrades have been installed are unlikely to be able to defend against the huge threats terrorists and criminals have shown they can pose in today's Russia, from surprise attack by 30-40 heavily armed, well-trained suicidal attackers to insider theft conspiracies involving half a dozen or more well-placed insiders. Only modest progress has been made in consolidating nuclear weapons and weapons-usable materials into a smaller number of sites and in putting in place effective and effectively enforced nuclear security rules. And while the United States is paying to install effective, modern security and accounting equipment, that equipment will not provide high security unless nascent efforts to forge a strong "security culture" succeed, so that guards no longer patrol without ammunition in their guns and staff no longer turn off intrusion detectors or prop open security doors. Finally, whether Russia will provide the resources, incentives, and organizations needed to sustain high levels of security after international assistance phases out remains very much an open question; to date, Russian government funding for nuclear security remains far below what is needed.

SECURING STOCKPILES IN THE REST OF THE WORLD

In the rest of the world, there is even less good news.

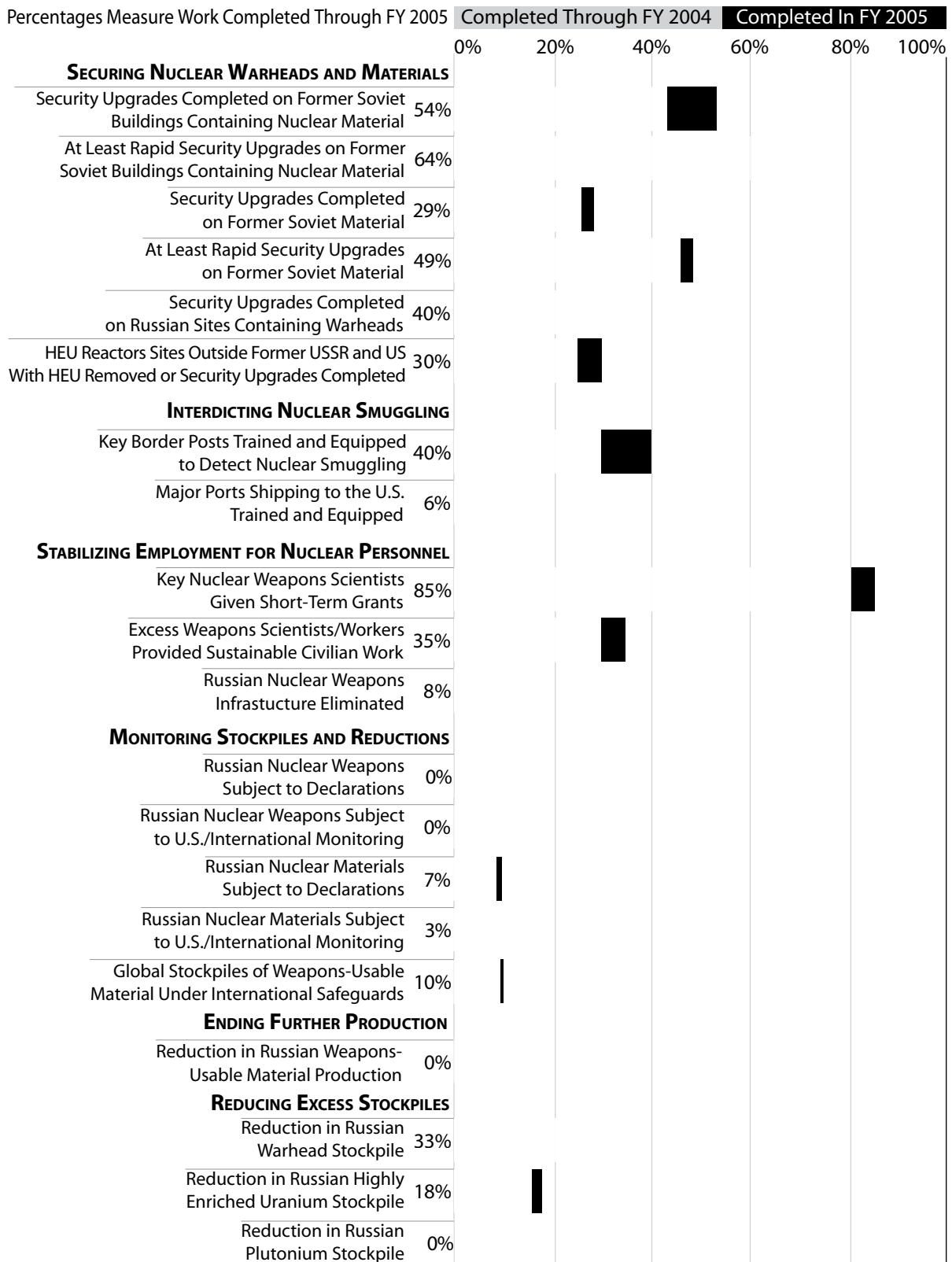
At many sites around the world, weapons-usable nuclear material remains dangerously vulnerable to either outsider or insider theft, even though many countries have strengthened their nuclear security rules since 9/11. Civilian facilities such as research reactors often have little more security than a night watchman and

a chain-link fence. Pakistan's stockpiles remain an urgent concern: while heavily guarded, they face immense threats, from armed remnants of al Qaeda to nuclear insiders with a proven willingness to sell nuclear weapons technology.

For most countries outside the former Soviet Union, U.S.-sponsored security upgrades have barely begun or are not yet even on the agenda. While the establishment of GTRI has significantly accelerated the pace of removing weapons-usable material from vulnerable sites around the world, major gaps in that effort have not yet been filled—including two-thirds of the U.S.-supplied highly enriched uranium (HEU) abroad that is still not covered by the U.S. take-back offer and dozens of HEU-fueled research reactors (representing nearly half of the global total) that are not yet targeted for conversion to safer fuels. The upgrades that are being done through GTRI, moreover, are designed to meet a minimal security standard far below the security level U.S.-funded upgrades are seeking to achieve in Russia, which in turn is less than what the Department of Energy requires at its own sites.

No fast-paced global coalition focused on securing nuclear stockpiles worldwide yet exists. Despite some worthwhile recent agreements related to nuclear security, no effective global nuclear security standards have been put in place, leaving the level of security provided to potential nuclear bomb material up to each of the dozens of states that have such material. Neither the U.S. government nor any other government or organization has a truly comprehensive plan for ensuring that *all* the nuclear warheads and caches of weapons-usable material around the world are secure and accounted for.

Figure ES-1
Controlling Nuclear Warheads, Material, and Expertise:
How Much Work Have U.S.-Funded Programs Completed?



CONTROLLING NUCLEAR WEAPONS, MATERIALS, AND EXPERTISE

Figure ES-1 shows what fraction of various parts of the job of controlling nuclear warheads, materials, and expertise in the former Soviet Union and worldwide were completed by U.S.-funded programs by the end of FY 2005. The measures of progress are divided into programs to secure nuclear stockpiles, to interdict nuclear smuggling, to stabilize employment for nuclear personnel, to monitor nuclear stockpiles, to end production of nuclear materials, and to reduce the stockpiles of nuclear weapons and weapons-usable nuclear materials that already exist. All of these measures are only rough indicators of progress: from forging strong security cultures to strengthening nuclear security regulation, a great deal that is not captured in these measures also needs to be done.

Nevertheless, Figure ES-1 makes clear that a similar story of “some good news, but still too much bad news” can be told across the spectrum of these efforts. The programs targeted on these objectives have demonstrably reduced the danger of nuclear theft at scores of buildings in the former Soviet Union and a few buildings elsewhere; they have permanently destroyed thousands of bombs’ worth of nuclear material; they have put radiation detection equipment at scores of key border crossings around the world; and they have offered at least temporary civilian re-employment for thousands of nuclear experts who were no longer needed in weapons programs. These efforts have represented an excellent investment in U.S. and world security. Hundreds of experts and officials from the United States, Russia, and other countries and organizations have worked hard, and often creatively, to achieve this progress, and the world is significantly more secure as a result of their efforts.

But in virtually every category of effort, there is much more to be done. The blank space on the chart represents thousands of nuclear weapons and enough material for thousands more at buildings and bunkers with security upgrades not yet installed; hundreds of high-priority border crossings around the world without effective nuclear security detectors yet in place; thousands of nuclear workers with potentially dangerous nuclear knowledge not yet re-employed; and tens of thousands of bombs’ worth of plutonium and HEU that is no longer needed for military purposes but has not yet been destroyed.

BUDGETS AND POLITICAL RESOURCES

For FY 2007, the Bush administration has requested a total of \$1.077 billion for programs focused on controlling nuclear warheads, materials, and expertise around the world—an amount essentially identical to the previous year’s appropriation in nominal terms, and a slight decrease in real terms. While this represents only one quarter of one percent of U.S. defense spending, the reality is that for most of these programs, progress is constrained more by limited cooperation with foreign partners and bureaucratic impediments than it is by lack of funds. There are a few exceptions, however, where modestly increased investments could significantly accelerate the pace of progress. The most fundamental missing ingredient of the U.S. and global response to the nuclear terrorism threat to date is sustained high-level leadership. On the one hand, President Bush has repeatedly emphasized the danger of nuclear terrorism and the need for action to address it. Indeed, with the significant acceleration of nuclear security work with Russia that resulted from the February 2005 summit accord with President Putin, he demonstrated the difference that presidential leadership can make.

But like President Clinton before him, President Bush and his top White House leadership have not provided the sustained, day-in and day-out focus needed to overcome the myriad obstacles to ensuring that nuclear stockpiles around the world are secure and accounted for. In many cases, problems have been allowed to fester unresolved for years at a time. To take just three of the examples documented in this report:

- The giant secure-storage facility for nuclear weapons material built with U.S. funds at Mayak, in Russia, still stands empty some two and a half years after it was completed;
- The Global Partnership Against the Spread of Weapons and Materials of Mass Destruction, launched with great fanfare at the 2002 summit of the Group of Eight (G8) industrial democracies, has been allowed to drift into focusing primarily on dismantling attack submarines and destroying chemical weapons, with only a dribble of non-U.S. funds going to improving security for nuclear stockpiles; and
- No initiative on nuclear security was included in the negotiation of the U.S.-India nuclear deal, though lower-level officials had been trying to convince India to cooperate on nuclear security improvements for years. Achieving rapid improvements in nuclear security will require sustained leadership from the top levels of the White House and its counterparts in leading states around the world. Success is within reach: President Bush, President Putin, and their counterparts still have an opportunity to leave as one lasting legacy a world heading toward dramatic reductions in the risk of nuclear terrorism.

RECOMMENDATIONS TO REDUCE THE RISK

The danger of nuclear theft and terrorism is a global problem, requiring a global response. The presidents of the United States and Russia, along with the heads of state of other leading nuclear weapon and nuclear energy states, should join together in taking three actions:

- launching a global coalition to prevent nuclear terrorism;
- forging effective global nuclear security standards; and
- accelerating and broadening current efforts toward a global cleanout, in which weapons-usable material would be removed from the world's most vulnerable sites as rapidly as possible.

Numerous other actions to strengthen programs to block terrorists on later steps in their pathway to a nuclear bomb are also critical, though these efforts will provide less leverage in reducing the risk of nuclear terrorism than will steps to secure and consolidate nuclear stockpiles, which are the focus of our recommendations.

A Global Coalition to Prevent Nuclear Terrorism

President Bush should immediately begin working with Russia and other leading nuclear-weapon and nuclear-energy states to gain their agreement to participate in a global coalition to prevent nuclear terrorism. This coalition could be built around a fundamentally reenergized and refocused Global Partnership, or, if that proves impossible, it could be a new, complementary initiative. The participants in this coalition would agree to protect all of their nuclear stockpiles to an agreed standard sufficient to defeat the threats

terrorists and criminals have shown they can pose; to encourage, assist, and pressure other states to do likewise; to sustain effective nuclear security for the long haul using their own resources; to reduce the number of locations where nuclear weapons and weapons-usable nuclear materials are located (thereby achieving higher security at lower cost); and to take other steps to cooperate to reduce the dangers of nuclear terrorism, from expanding intelligence and law enforcement cooperation targeted on nuclear theft and smuggling to putting in place criminal laws making actual or attempted nuclear theft or terrorism a crime comparable with murder or treason. As part of the effort, the coalition partners would also work to expand the mission, personnel, and resources of the International Atomic Energy Agency's Office of Nuclear Security, allowing that agency to substantially increase its contribution to preventing nuclear terrorism. The participants should commit to providing the resources necessary to ensure that lack of funding does not constrain the pace at which nuclear stockpiles around the world can be secured and consolidated.

Deliberate decisions by hostile states to provide nuclear bomb materials to terrorists are a smaller part of the danger of nuclear terrorism than nuclear theft, because regimes focused on their own survival know that any such act would risk overwhelming retaliation. Nevertheless, gaining international agreement on packages of carrots and sticks large and credible enough to convince Iran and North Korea that it is in their interests to verifiably abandon their nuclear weapons efforts would be a key contribution to reducing the danger of nuclear terrorism, and should also be a focus of the global coalition.

This global coalition should include the G8 industrialized democracies, along

with China, India, Pakistan, and, ideally, Israel (which is believed to have a significant stockpile of nuclear weapons) and South Africa (which once had nuclear weapons, and still has one of the largest stockpiles of HEU among the developing non-nuclear-weapon states). All of these states should be offered roles as co-leaders of this global effort, rather than as mere recipients of assistance currently unable to properly secure their own stockpiles.

To be effective, the coalition would need a strong mechanism for ensuring that the initial commitments were fulfilled. A standing group of senior officials appointed by the leader of each coalition partner would be responsible for implementing the global coalition commitments, developing agreed plans with measurable milestones, devising means to overcome obstacles to success, and reporting on the coalition's progress to the leaders of the participating states on a regular basis.

Such a coalition would still have much to do in Russia to complete the cooperative upgrades now under way, to ensure that security measures are put in place that are sufficient to meet the threats that exist in today's Russia, to forge a strong security culture, and to see that high levels of security for nuclear stockpiles will be sustained after international assistance phases out. But the work with Russia should become a true partnership, framed as one part of this global coalition. Continuing bilateral cooperation with other countries should similarly be based on partnership, as one part of the global coalition, focusing on the same central objectives. To succeed, the approaches that have been developed in cooperation with the former Soviet states will have to be adapted to the different national cultures, approaches to secrecy, and legal frameworks that exist in other countries. The United States and other co-

alition partners should take steps to ensure that states and facilities have strong incentives to provide effective nuclear security, from working with states to put in place effective nuclear security regulation to establishing preferences in all contracts for facilities that have demonstrated superior nuclear security performance.

Effective Global Nuclear Security Standards

As part of a global coalition to prevent nuclear terrorism, President Bush and other leaders of major nuclear-weapon and nuclear-energy states should immediately seek agreement on a broad political commitment to meet at least a common minimum standard of nuclear security. Effective global standards are urgently needed, for in the face of terrorists with global reach, nuclear security is only as good as its weakest link. The standard should be designed to be rigorous enough that all stockpiles with security measures meeting the standard are well protected against plausible insider and outsider threats, but flexible enough to allow each country to take its own approach to nuclear security and to protect its nuclear secrets. For example, the agreed standard might be that all nuclear weapons and significant caches of weapons-usable nuclear materials be protected at least against two small groups of well-armed and well-trained outsiders, one to two well-placed insiders, or both outsiders and insiders working together.

United Nations Security Council Resolution 1540, which legally requires all states to provide “appropriate effective” security and accounting for any nuclear stockpiles they may have, provides an excellent opportunity, as yet unused, to back up such a high-level political commitment. If the words “appropriate effective” mean anything, they should mean that nuclear

security systems could effectively defeat threats that terrorists and criminals have shown they can pose.

Hence, the United States should seek the broadest possible agreement that UNSCR 1540 already legally binds states to meet a minimum level of nuclear security. The United States should immediately begin working with the other coalition participants and the IAEA to detail the essential elements of an “appropriate effective” system for nuclear security, to assess what improvements countries around the world need to make to put these essential elements in place, and to assist countries around the world in taking the needed actions. The United States should also begin discussions with key nuclear states to develop means to build international confidence, without unduly compromising nuclear secrets, that states have fulfilled their commitments to take effective nuclear security measures.

Complementing such government efforts, the nuclear industry should launch its own initiative focused on bringing the worst security performers up to the level of the best performers, through definition and exchange of best practices, industry peer reviews, and similar measures—a World Institute for Nuclear Security (WINS) on the model of the World Association of Nuclear Operators (WANO) established to improve global nuclear safety after the Chernobyl accident.

An Accelerated and Expanded Global Cleanout

The only foolproof way to ensure that nuclear material will not be stolen from a particular site is to remove it. As part of the global coalition to prevent nuclear terrorism, the United States should immediately begin working with other countries to take steps to accelerate and

expand the removal of weapons-usable nuclear material from vulnerable sites around the world. Where material cannot immediately be removed, the United States should speed steps to ensure that high levels of security will be put in place and maintained. The goal should be to remove the nuclear material entirely from the world's most vulnerable sites within four years—substantially upgrading security wherever that cannot be accomplished—and to eliminate all HEU from civilian sites worldwide within roughly a decade. The United States should make every effort to build international consensus that the civilian use of HEU is no longer acceptable, that all HEU should be removed from all civilian sites, and that all civilian commerce in HEU should be brought to an end as quickly as possible.

Achieving these goals will require a strengthened, broadened effort, including substantial packages of incentives to give up nuclear material, targeted to the needs of each facility and host country. The U.S. take-back offer should be expanded to cover *all* stockpiles of U.S.-supplied HEU, and, on a case-by-case basis, other weapons-usable nuclear material that poses a proliferation threat. The United States should seek agreement from Russia, Britain, France, and possibly other countries to receive and manage high-risk materials when the occasion demands. Those HEU-fueled research reactors that can convert to non-weapons-usable low-enriched uranium (LEU) using existing fuels should be given strong incentives to do so. The remaining HEU-fueled reactors that are still needed and cannot yet convert should be converted to LEU as soon as appropriate fuels are developed, and provided with high levels of security in the meantime. Aging and unneeded research reactors using HEU fuel should be given strong incentives to shut down—a step in many cases cheaper and quicker than conversion to LEU—perhaps as part of an IAEA-led

“Sound Nuclear Science Initiative” focused on getting the science, training, and isotope production the world needs at minimum cost, with a smaller number of more broadly shared research reactors. To not only remove threats from inside U.S. borders but also to enable U.S. leadership in convincing others to do the same, the United States should also convert or adequately secure its own HEU-fueled research reactors.

The focus on HEU should not lead the world community to ignore the burgeoning global stockpiles of separated civilian plutonium. The Bush administration should renew the effort to negotiate a 20-year U.S.-Russian moratorium on separating weapons-usable plutonium that was almost completed by 2001 and should work actively to ensure that its reconsideration of modified approaches to reprocessing in the Global Nuclear Energy Partnership does not encourage the spread of plutonium separation facilities.

Ingredients of Success

None of these initiatives will be easy. A maze of political and bureaucratic obstacles must be overcome quickly if the world's most vulnerable nuclear stockpiles are to be secured before terrorists and thieves get to them. The job of keeping nuclear weapons and their essential ingredients out of terrorist hands requires broad international cooperation affecting some of the most sensitive secrets held by countries around the globe. Sustained leadership from the highest levels of government, in the United States and around the world, will be needed. The United States should make nuclear security a central item on its diplomatic agenda, an item to be addressed at every opportunity, with every relevant state, at every level, until the job is done. Several ingredients will be critical to success.

First and most important, if political leaders and facility managers around the world are to take the actions necessary to achieve high levels of nuclear security, they must be convinced that nuclear theft and terrorism is a real and urgent threat to their own countries. Many of them are not convinced of this today. The United States and other countries should take several steps to build the needed sense of urgency and commitment, including:

- sponsoring briefings for political leaders of key countries, given jointly by U.S. and domestic nuclear experts, that outline both the very real possibility that terrorists could get nuclear material and make a nuclear bomb, and the global economic and political effects of a terrorist nuclear attack;
- encouraging leaders of key states to pick teams of security experts they trust to carry out fast-paced reviews of nuclear security in their countries assessing whether facilities are adequately protected against a set of threats the leaders would specify;
- working with key states to put in place regular systems of realistic testing of security performance;
- carrying out war games and similar exercises with senior policy-makers of key states; and
- creating shared databases of unclassified information on actual security incidents that offer lessons for the threats policy-makers and facility managers need to consider in deciding on nuclear security levels and the steps that can be taken to defeat those threats.

Second, success is likely to require mechanisms to keep the issue of nuclear security on the front burner at the top levels of

government, day-in and day-out. To lead these efforts in the United States, President Bush should appoint a senior full-time White House official with the access needed to walk in and ask for presidential action when needed. That official would be responsible for setting overall priorities, for eliminating overlaps, for seizing opportunities for synergy, and for finding and fixing the obstacles to progress in the scores of existing U.S. programs scattered across several cabinet departments of the U.S. government that are focused on pieces of the job of keeping nuclear weapons out of terrorist hands. As part of the global coalition described above, President Bush should lean on Russian President Putin and the leaders of other coalition participants to appoint a similar top-level official.

Third, the United States should base its international nuclear security approaches on genuine partnership, with experts from each country where these stockpiles reside playing key roles in the design, implementation, and evaluation of the entire effort in their countries. Experts from these countries will inevitably know more about their countries' stockpiles and what can and cannot be done there than U.S. experts will, and data from a wide range of other types of international assistance efforts make clear that the long-term success rate is far higher when assistance recipients are deeply involved in project design and implementation than when this is not the case. Strategic plans, timetables, and milestones should therefore be developed jointly by the country where the nuclear stockpiles in question exist and its foreign partners, using both the country's own funds and foreign funds. Steps to enhance or limit cooperation with particular countries on other matters—particularly with respect to nuclear technologies—should be considered in the light of their potential effect on cooperation to ensure effective nuclear security.

Finally, the United States and other providers of nuclear security assistance should take a flexible approach to ensuring that their taxpayers' funds are spent appropriately without unduly demanding that states open up their nuclear secrets. Methods that have proven effective include: providing training, software, and other tools that states can use to assess vulnerabilities and upgrade security themselves; providing U.S.-funded nuclear security equipment that recipient states install at their own expense; relying on photographs, videos, operational reports, and certifications by senior officials to ensure that equipment is installed and used as agreed; and using "trusted agents" from the country where cooperation is taking place, who have security clearances from that country but who are employed by a contractor from the donor country, to certify that equipment has been installed and used appropriately.

Options for the U.S. Congress

The U.S. Congress can also act to help reduce the chance that terrorists could acquire a nuclear weapons capability. In particular, Congress should consider:

- mandating fast-paced efforts to secure nuclear stockpiles and interdict nuclear smuggling worldwide;
- eliminating certification requirements and restrictions on threat reduction assistance;
- adding approximately \$50 million to the requested budget for GTRI, to expand the effort to cover additional at-risk materials and reactors, to fund needed incentives to states and facilities to give up their weapons-usable materials, to strengthen and accelerate the effort to upgrade security at HEU-fueled research reactors, and to

accelerate efforts to control radiological sources around the world;

- appropriating an additional \$5-\$10 million for the IAEA Office of Nuclear Security (with flexibility to spend it on the highest-priority tasks);
- adding approximately \$10 million to the requested budget for the Global Initiatives for Proliferation Prevention program, which now has opportunities for new work that were not envisioned when the FY 2007 budget was prepared;
- providing additional funding for programs to help ensure that partner states can and will sustain effective nuclear security for the long haul;
- offering a conditional appropriation in the range of \$200-300 million to finance accelerated blend-down of HEU in Russia to LEU, if U.S. and Russian negotiators reach accord on such an initiative; and
- increasing budgets and broadening authorities for programs at the Departments of Defense, Energy, and State to interdict nuclear smuggling and help countries improve export controls, to meet the charge of UNSCR 1540.

A LONG ROAD YET TO TRAVEL

As President Bush has said, the nations of the world must do "everything in our power" to ensure that terrorists never gain control of the fearsome power of a nuclear bomb. The steps recommended above could lead the way toward a faster, more effective, and more comprehensive effort to lock down the world's nuclear stockpiles before terrorists and criminals can get to them. There is still time to win the race to prevent a nuclear 9/11.